12 IT In Society

12.1 Digital currencies

Electronic currency

It is a payment that occurs in digital form which doesn't involve the exchange of physical currency such as coins and bank notes. There are several types of electronic currency including:

- digital currency
- virtual currency
- cryptocurrency
- central bank digital base money
- stored value cards

Digital Currency

It is the money that is available in a digital or electronic form. Currency is exchanged digitally using computers instantly rather than exchanging physical bank notes and coins. Popular modes of payment are through credit cards, mobile phones and smart watches. It allows easy transaction across borders

Characteristics:

Uses:

Digital currencies can be either **centralized**, one that has a central body that is managing and regulating the use of currency; or **decentralized,** one that doesn't have a central body managing the process. The most common way to manage the transactions with decentralized systems is through the use of a ledger for exp; blockchain.

Centralized Systems:

- **credit/debit card:** They can be used with card reading machines, they can either be swiped and the magnetic strip can be read or they can be inserted in the machine for the chip to be read. Another method is the contactless method where touching the card to the computer/machine is only required for payment. In all cases data is read through

preferred method by the computer and the bank is located from data. A request is sent to deduct the required of money from the customers balance and transfer it to the business's bank account

- **electronic point of sale:** EPOS is the computerized system used in shops to enter sales information, handle customer loyalty programs, manage stock inventory etc. It's basically the checkout point where the customer transaction are done electronically (*pos involves payments made thru physical cash and record being maintained on register books)*

Decentralized Systems:

- **Bitcoin:** A form of cryptocurrency that aims to eliminate the need for central authorities such as banks or government. It makes use of blockchain technology to support p2p transactions between users on a decentralised network
- **LiteCoin:** A type of cryptocurrency created from the fork of the Bitcoin blockchain to complete transactions quickly and cheaply. Its also p2p and decentralized.
- **peer to peer electronic monetary systems:** This type of payment system is designed to allow peers to send electronic payment to each other without the need for it going via a central body, such a financial institution

Mobile Electronic Wallet:

- It is a method of contactless payment that can be performed through a mobile or smart watch connected to a mobile
- User must download an app on device that stores the credit card information and other required details
- The device is then used as digital credit/debit card/ electronic wallet
- It allows for payment of goods and services digitally
- Data is read from device and request is sent to bank to transfer money from users bank

Process (4 marks):

- User downloads app from finance provider
- Registers with provider on app
- Inputs phones in order to receive verification code via sms
- User authenticates number when receiving verification message
- User inputs credit card details or adds account details
- This allows linking to bank account

- User authenticates payment details

Advantages of Digital Currency:

- No need to carry physical money around
- Provides fixed records of transactions
- Incase of theft or lose of credit card or mobile/watch, the bank can be contacted to block all monetary transactions
- Use of contactless payment an speed up the payment process of goods and services
- Digital currency allows international payments to be easily made in one currency to another.
- Contactless payment don't require PIN number each time
- Daily/monthly transaction limits can be sent which prevents over spending

Disadvantages of Digital Currency:

- There is often a limit on contactless payments
- Risk of data transaction getting hacked as data is sent electronically
- There is a risk of being accidentally charged for someone's transaction if you walk past a machine that supports contactless payment
- Risk of money being stolen through contactless payment as long as you are in the set proximity that enables transactions to go through.

Virtual Currency

Virtual currency is a decentralized system. It only exists within a virtual environment and doesn't have a physical representation as bank notes and coins. An example of it would be tokens that can be collected or purchased such within computer games; it allows user to purchase new powers or clothing. For this reason, a virtual currency is normally specific to games or applications for which it is created for can cannot be used elsewhere. Another example of virtual currency is on streaming platforms where in app currency/ tokens can be bought to purchase special effects messages that get displayed in real time on the video stream.

Advantages of Virtual Currency:

- It can personalize game or application by making it fun to collect and spend the specific virtual currency
- It doesn't have expensive manufacturing and physical storage costs
- They can be programmed to complete automated transactions
- It increases transaction seeds and eliminate geographical boundaries

Disadvantages of Virtual Currency:

- It's a decentralized system so has little regulation
- Usually specific to the context for which it was created and can't be spent elsewhere
- Can be subject to scams

Cryptocurrency

The cyrptocurrency is a digital or virtual currency that is secured by cryptography which makes it impossible to counterfeit or double spend. Many cryptocurrencies are decentralized networks based on blockchain technology – *a distributed ledger enforced by a disparate (differing) networks of computers.* They are also a type of peer to peer electronic monetary system. A feature of it is that they are generally not issued by any central authority, making it immune to government interference or manipulation. Bitcoin and LiteCoin are well known examples of it

Advantages of Cryptocurrency:

- There are minimal fund transfer fees as compared to banks
- It is difficult to counterfeit
- Has potential for high returns so makes it a great investment

Disadvantages of Cryptocurrency:

- The decentralised system allows a level of anonymity which can encourage criminal activities that can go untraced such as money laundering and tax evasion.
- It has high volatility and potential for large losses
- Since its unregulated and not backed up, it is susceptible to cyber hacking

Central Bank Digital Base Money

Central base digital base money is also known as central bank digital currency (CBDC) which is the digital form of fiat money. Fiat money is basically the physical money used in any country that is issued by the state bank for payment of any goods and services. Digital fiat money is digitalizing the real world money and effectively creating a digital currency. It is similar to paper bank notes as it also has its own serial number to make it distinguishable & prevent counterfeits. Banks intend to use it as a controlled supply along with the existing currency.

Advantages of CBDC:

- Prevents criminal acts such as money laundering and tax evasion as transactions can be traced
- Cost of producing money can be reduced as no paper or printing will be needed
- Banks ability to speed up exchange of money will be greatly improved
- Simplifies the implementation of monetary policy and government functions

Disadvantages of CBDC:

- Users may have to give up some degrees of privacy
- Since it's a digital currency it is also vulnerable to cyberattacks that could result in loss of funds or sensitive information

Stored Value Cards

Stored value cards are similar to credit cards however they have a set amount of currency stored on it. This card can be used to pay for items and values stored on the card until it reaches 0. There are two types of stored value cards. One is the closed loop card, where a monetary value can only be loaded on to the card once and it is discarded when all the money is spent, an example of this would be gift cards that could be purchased for particular stores. The other kind is open loop, this is where a monetary value can be repeated loaded onto the card, an example of this would be college cafeteria cards that can be recharged multiple times.

Advantages of Stored Value Cards:

- Prevents over spending and debts as only the set amount of money can be used unless recharged
- Some stores don't have credit check or minimum balance check before a transaction takes place for stored value cards which allows ease of access
- Payments made from stored value card doesn't affect the users credit history which maintains a level of anonymity

Disadvantages of Stored Value Cards:

- Some have inactivity fee or duration, after a certain period of unactivity the currency stored expires or a fee is charged
- Purchases made from store value cards doesn't help build up credit hence some prefer not to use it
- Closed loop cards limit purchasing power
- There are fees to reload card sometimes making it cheaper to just purchase items with normal credit cards/cash

Impacts and risks of digital currencies

Read textbooks, its mostly the disadvantages mentioned, i.e crytocurrency is bad for banks as they earn fees from transactions that take place through business and it encourages tax evasion and money laundering. Etc etc etcc kuch likhdena bus

12.2 Data Mining

Data mining is a form data analysis and artificial intelligence. **It is the process of collecting large sets of data and analyzing theme to identify patterns and trends**. This information can be used to help identify future and past trends that could be very valuable to a company. The large sets of data are stored in data warehouses. Computers are used for data mining due to the sheer volume of data that is searched and analyzed.

READ ONLY

*1. **Business Understanding:***

*- **What it means:** Figure out what the business wants to achieve with the data. Understand the goals and why we're digging into the data in the first place.*

*- **Example:** If a store wants to increase sales, understanding which products are popular among customers could be the goal.*

*2. **Data Understanding:***

*- **What it means:** Get to know the data you have. What information is available? What does it look like? Understand the basics of your dataset.*

*- **Example:** If you're studying customer behavior, this step involves looking at data like purchase history, demographics, and preferences.*

*3. **Data Preparation:***

*- **What it means:** Clean up and organize the data so it's ready for analysis. Fix errors, handle missing information, and get the data into a format that's useful.*

*- **Example:** If some customer records are incomplete, fill in the missing details or remove the incomplete entries.*

*4. **Data Modeling:***

*- **What it means:** Time to build models that can find patterns or make predictions. Choose the right tools or techniques to analyze the data.*

*- **Example:** Use algorithms to predict which products customers might be interested in based on their past purchases.*

*5. **Evaluation:***

*- **What it means:** Check how well your models are doing. Are they accurate? Do they meet the goals set in the first step? Evaluate their performance.*

*- **Example:** Assess if the predictions made by the model align with the actual buying behavior of customers.*

*6. **Deployment:***

*- **What it means:** Implement the findings or solutions in the real world. Put the results to use, so the business can benefit from the insights.*

*- **Example:** If the model suggests certain marketing strategies, deploy those strategies in the actual marketing campaigns.*

These steps help businesses make informed decisions, improve processes, and achieve their goals by tapping into the potential insights hidden within their data.

Stage 1: Business understanding

- In this stage business **goals and their impact are identified** *(the need of business)*
- **Situation is assessed** to determine what needs to be achieved or solved to complete to reach the goal *(what is the problem)*
- **Goals are defined** of the data mining process *(goals/objectives to overcome problem)*
- **A plan is established** to develop a roadmap for the data mining process *(,outlining tasks and timelines) to achieve the business objectives*

Stage 2: Data understanding

- This stage involves **initial collection data to explore available data**
- **Data is documented**
- **Sources are listed** of the data that has been gathered
- **Data quality is assessed and verified** to identify any issues that need to be addressed *(checking completeness, accuracy of data,etc)*
- **Identifying variables**, recognizing the relevant variable that may impact the analysis and decision making.

Stage 3: Data preparation

- **Data selection** takes places, relevant data is chosen from available resources
- **Data cleansing,** errors are corrected, missing values are inserted and incorrect and inconsistent data is removed
- **Data transformation,** construction and formatting of data takes place to make sure it is in the required form for the business
- This can allow for patterns and trends to be established in the data, relating to the business needs.

Stage 4: Data modeling (ask for examiner report and candidate response booklet)

- **Appropriate data mining algorithms are selected** based on the nature of the problem
- **Models are created** by running selected algorithms on old selected data
- **Model parameters are adjusted** to improve accuracy and performance

- **Models are validated** by testing them on new data to ensure they generalize well and provide reliable results.

Stage 5: Evaluation

- **Models are evaluated** by assessing the performance and how well it meets the defined goals and objectives
- **Results are interpreted** to understand insights generated by models and to identify old and look for new patterns that might have been generated
- **Models are compared** to identify the most effective one
- **Iterate if necessary** if results are not satisfactory, adjustments are made to models or data preparation process

Stage 6: Deployment

- **Models are implemented** into the business environment or systems for practical use
- **Performance is monitored and documented**
- **Final results are reported** to stakeholders
- **Results are reviewed** in order to check for errors and how to correct them

Uses of Data Mining

National Security & Surveillance:

It is used in national security and surveillance to analyse huge sets of data in order to find hidden patterns, predict potential threats and take proactive measures to maintain safety and security of the civilians and government. It is used in-

- **Identifying threats**; could be done by identifying patterns that suggest terrorist activities, cyber-attacks or other criminal actions; an example of this will be identifying school shooting threats from social media comment sections
- **Monitoring communications** through recorded phone calls or saved emails or any other communication channel. Authorities could look for specific keywords or patterns that suggest suspicious activity.

- **Predictive analysis**, eg by mining previous criminal records from police stations , trends and patterns could be identified that may help predict and prevent another security incident.
- **Enhancing border security**, used at border to analyse travel records & other data to identify individuals who may pose a threat.
- **Cyber security,** is concerned with protecting computers and network systems that contain government confidential, data mining can recognize patterns that indicate cyber attacks
- **facial recognition and biometrics** through mining data from CCTV footage or airport check-ins, etc to identify and track individuals posing a threat.

Businesses:

Business use data mining to understand their customers and operations better in order to increase sale and gain an advantage against their competitors, such as-

- **Predicting customer's needs**, by looking at their buying habits with the use of data mining can help companies understand the audience they are reaching and create items/services that cater their needs**.**
- **Running targeted marketing**, with the help of data mining, customers profiles can be created to target them with special offers and promotion that they are more likely to take interest in.
- **Predicting trends**, data mining allows past trends to be recognized and future trends to be predicted, businesses can identify their est selling item and restock it and create similar items.
- **Improving sale strategies**, by identifying when, what and where customers purchase the most and adjusting inventory and sales schedule based on the right time that could be predicted from data mining.
- **Spotting fraud**, allows business to identify suspicious transactions and create a blocklist in order to prevent loss by prohibiting orders made by certain credit card numbers or at addresses aswell as maintain a blocklist for sellers that try to fraud
- **Enhancing customer service**, by analyzing customer feedbacks and complaints through data mining business can help improve their customer services.

Scientific Research:

Data mining in scientific research helps researchers speed up their research process by allowing them to dig into big data, find patterns, make predictions and come up with new discoveries and solutions. Here are some applications-

- **Healthcare Research** : Doctors and scientists use data mining to find patterns in medical data. This can help them predict diseases, understand how different treatments work and improve patient care.
- **Environmental Studies**: Researchers analyze data from the environment like air quality or temperature, to track climate change, predict natural disasters or find ways to protect endangered animals
- **Market Research**: Companies use data mining to understand what customers want. They analyze shopping patterns, online reviews and social media to make better products and improve sales strategies.
- **Educational Research**: Educators and policymakers use data mining to understand how students learn, They look at test scores, study habits and other data to improve teaching methods and educational materials.
- **Genetic Research:** Scientists mine genetic data to learn about DNA, diseases ad health. This helps in finding new treatments and understanding how genetics affect our health
- **Astronomy:** Astronomers use data mining to handle the vast amount of data from telescopes and space missions. This helps them discover new stars, galaxies and understand the universe better.
- **Social Science Research:** Social scientists analyze data from surveys, social media and other sources to study human behavior, social trends and cultural patterns.

Healthcare:

Data mining in helps healthcare providers make smarter decisions, predict diseases, personalize treatments and improve overall patient care.

- **Predicting Diseases:** Mining allows doctors to look at patient records and find patterns that can predict illnesses like heart disease or diabetes before they become serious/
- **Personalized treatment:** By analyzing a patients and health data, data mining helps in tailoring treatments specifically for them which can be more effective than one size fits all solutions.
- **Drug development:** Pharmaceutical comanies use data mining to analyse research data, speeding up the discovery of new drugs and ,making the development process more efficient.

- **Managing healthcare costs:** Hospitals and clinics use data mining to look at treatment costs and patient outcomes, helping them provide better care at a lower cost.
- **Reducing hospital readmissions:** Data mining helps predict which patients are likely to be readmitted, allowing healthcare providers to take preventive measures.
- **Preventing Fraud and Abuse:** Mining helps in detecting fraudulent activities in healthcare, like false insurance claims or prescription misuse, by analyzing patterns in billing and clinical data.

Analysis of social and economic trends:

Data mining in social and economic trend analysis helps experts sift through mountains of data to spot patterns, predict changes, and make better, informed decisions about the future.

- **Understanding Consumer Behavior:** By examining shopping patterns, online searches, and social media activity, data mining helps businesses and economists understand what people are buying and why. This can reveal trends in consumer preferences and spending habits.

- **Predicting Market Trends**: Data mining analyzes financial data, stock markets, and economic indicators to predict future market trends. This helps investors and businesses make informed decisions about where to invest or what products might be popular.

- **Analyzing Social Media:** By looking at posts, likes, and shares on social media, data mining can identify trends in public opinion, popular culture, and political movements.

- **Tracking Employment and Economic Growth:** Data mining helps in understanding job market trends, unemployment rates, and areas of economic growth or decline. This is crucial for policymakers and governments to plan and make decisions.

- **Real Estate Analysis**: It's used to analyze housing market trends, like changes in property values or rental prices, helping both buyers and sellers make better decisions.

- **Identifying Public Health Trends:** By mining health-related data, experts can spot trends in public health, like the spread of diseases or the effectiveness of health campaigns.

- **Assessing Environmental Impact:** Data mining can reveal trends in environmental data, such as pollution levels or climate change, which is vital for planning and policy-making.

Ethical and Privacy Concerns

Data mining, while super useful, also raises some important ethical and privacy concerns. Here's a simple explanation of these implications:

- **Privacy Invasion:** Data mining often involves analyzing personal data like shopping habits, social media activity, or medical records. People might not know their data is being used this way, which can feel like their privacy is being invaded.

- **Data Security:** When data is collected and stored for mining, there's a risk it could be stolen or misused. If someone hacks into the data, they could access sensitive information like bank details or private messages.

- **Misuse of Information:** The information from data mining can be used in ways that harm people. For example, it might be used to deny someone a loan, a job, or insurance based on their data profile.

- **Bias and Discrimination:** Sometimes, the algorithms used in data mining might be biased. They could make unfair assumptions about people based on their age, gender, race, or where they live. This can lead to discrimination.

- **Consent Issues:** Often, people don't explicitly agree (or might not be aware) that their data is being mined. This raises questions about consent and whether it's ethical to use their data without clear permission.

- **Transparency:** It can be hard to understand how data mining works and what's being done with the data. This lack of transparency can make people distrustful and concerned about how their data is being used.

Advantages of Data Mining:

- Allows organizations to make strategic decisions that can help maintain or increase their revenue.
- Allows organizations to understand their customers and create the products they need.
- Allows individuals to see targeted product advertising based on the things they already like.
- Allows individuals to see targeted product advertising based on the things they already like.
- Allows individuals to see targeted product advertising based on the things they already like.

Disadvantages of Data Mining:

- Software tools and skilled staff is required.
- Many people see the practice of data mining as both unethical and an invasion of their privacy.
- Storage cost for the data are very expensive, therefore, this can also increase the cost of the process of data mining.
- A great security issue, as hackers will want to gain access to the data because it has a high value.
- The outcomes produced by data mining are only predictions based on patterns and trends in past data. They are not an accurate science and it is very possible for them to be incorrect.

12.3 Social Networking Services/Platforms

Social networking: The use of websites and apps that allows users to communicate and interact with each other.

Chat Rooms

Chat room is an online service that allows multiple users to type messages to each other, allowing them to chat. Some chat rooms are public and accessible to anyone while others are private often requiring an invitation link or passcode to join. They don't require physical presence and any individual can join from around the world through the internet. Some even have features such as sending emotes, links and images but conversation mainly takes place in text only. People use chat rooms to discuss different subject, exchange information or just to socialize. They are often found on websites, forums or platforms where people interests gather, businesses may use it to introduce/test review items or as a customer support chat. In chat rooms messages are visible to all members.

Instant Messaging

Instant messaging is a form of real time communication that allows users to exchange text messages instantly over the internet. It provides quick and convenient method for individuals to have conversation whether one-on-one or in groups. It supports multimedia elements such as images, sound, videos and emojis. Most instant messaging facilities have a report feature which allows a user to see who has read their message, who is online right now and an option to enable notifications of incoming messages. A friend/contact list feature is also available in a lot of instant messaging features that allows them to send a chat request to their friend or block/remove them from chat. Many IM apps incorporate encryption and privacy features to secure the content of messages.

Forums

A forum is an online platform or website where people can have discussions by posting messages. It's like a digital bulletin board where users can create topic threads related to specific subjects and contribute to ongoing conversations. Each message in a forum can be a question, comment or reply and discussion often happening in a structured manner, with

threads containing a series of related messages. Forums are commonly used for sharing information, asking questions and connecting with others who have similar interests or expertise. They can cover a wide range of topics, from hobbies and technology to professional advice and support groups. Forums also organize threads into different discussion groups often called sub forum. Many forums have rules regarding post along with having moderators who remove posts that follow the rule or goes under the right topic discussion. Some are only membership based which requires you to make an account in order to post on it, sometimes to even view previous threads. Since messages in forums are usually archived, it allows users to access and reference past discussions.

Emails

Email is short for electronic mail, it is a digital communication method that allows users to and receive messages over the internet. It operates through a system of unique addresses for each user, enabling precise message delivery. An email typically comprises of a subject line, a main body containing the message and the option to attach files or documents. Users have inboxes for incoming messages and sent folders for all the emails they have created and sent. Emails can include replies or be forwarded to others, Security measures also exists in it such as spam filters and encryptions which helps users from unwanted content and enhance privacy. They serve as both personal and professional purposes, facilitating instant yet asynchronous communication.

Blogs

Blogs are online journals or informational websites where individuals or organizations regularly post articles, insights, or stories. Typically displayed in reverse chronological order, with the most recent content appearing first, blogs allow writers to share their thoughts, experiences, and expertise on a variety of topics, ranging from personal life to specialized subjects. They often feature an informal or conversational tone, making them accessible and engaging to a wide audience. Besides text, blogs can include images, videos, and links to other websites, enhancing the reader's experience. Readers can usually interact with the blogger through comments, fostering a community around the blog's content. Originally starting as personal online diaries, blogs have evolved to include professional and corporate blogs, significantly influencing online information sharing and content creation. This platform has become instrumental in digital marketing, journalism, and personal expression.

Microblogs

Microblogs are a type of online platform that allows users to share brief and concise updates, typically in the form of short text messages. The defining feature of microblogs is the character limit imposed on each post, restricting the length of messages to a few sentences or, in some cases, a limited number of characters. Users can share real-time information, thoughts, and links quickly and efficiently. Microblogging platforms often prioritize immediate and frequent updates, enabling users to maintain an ongoing and dynamic conversation with their followers. Microblogs play a crucial role in disseminating timely information, engaging audiences, and fostering concise communication in the digital space.

Social Media

Social media refers to online platforms and technologies that enable users to create, share, and exchange information, ideas, and content in virtual communities. These platforms facilitate interactive communication and engagement through various formats, including text, images, videos, and links. Social media has become a significant part of digital communication, allowing individuals, businesses, and organizations to connect with a global audience. Key features of social media include user-generated content, the ability to connect with friends or followers, real-time interaction, and the sharing of multimedia content. Social media plays a crucial role in shaping public discourse, disseminating information, and fostering online communities.

Uses *(read mostly)*

Education:

- **Chat Rooms:**
    - **Individuals:** Students collaborate on group projects and discussions.
    - **Organizations:** Educational institutions host virtual classrooms and study groups.
- **Instant Messaging:**
    - **Individuals:*** Quick communication between students, teachers, and parents.
    - **Organizations:** Educational organizations use instant messaging for internal communication.

- **Forums:**
    - **Individuals:** Students seek help and discuss academic topics.
    - **Organizations:** Educational institutions use forums for faculty collaboration and knowledge sharing.
- **Email:**
    - **Individuals:** Students communicate with teachers and peers.
    - **Organizations:** Educational organizations use email for official announcements and communication.
- **Blogs:**
    - **Individuals:** Students maintain personal blogs for reflections and creative writing.
    - **Organizations:** Educational institutions use blogs for sharing updates and educational resources.
- **Microblogs:**
    - **Individuals:** Quick updates on assignments, events, or announcements.
    - **Organizations:** Educational institutions use microblogs for real-time updates.
- **Social Media:**
    - **Individuals:** Students connect on platforms like Facebook or LinkedIn for networking.
    - **Organizations:** Educational institutions use social media for outreach, event promotion, and community engagement.

Finance:

- **Chat Rooms:**
    - **Individuals:** Traders and investors discuss market trends.
    - **Organizations:** Financial institutions use chat rooms for internal communication and collaboration.
- **Instant Messaging:**
    - **Individuals:** Quick communication for financial queries.
    - **Organizations:** Financial firms use instant messaging for internal coordination.
- **Forums:**
    - **Individuals:** Investors participate in financial forums for discussions.
    - **Organizations:** Financial institutions use forums for client engagement and support.
- **Email:**
    - **Individuals:** Communication with financial advisors and institutions.

    - **Organizations:** Official communication within financial firms.
- **Blogs:**
    - **Individuals:** Personal finance blogs for insights and investment tips.
    - **Organizations:** Financial institutions may have blogs for market analysis.
- **Microblogs:**
    - **Individuals:*** Quick updates on market trends.
    - **Organizations:*** Financial firms use microblogs for brief market updates.
- **Social Media:**
    - **Individuals:** Follow financial news on platforms like Twitter.
    - **Organizations:** Financial institutions use social media for brand building, customer relations, and market updates.

Health Care:

- **Chat Rooms:**
    - **Individuals:** Patients in support chat rooms.
    - **Organizations:** Healthcare organizations for internal communication and coordination.
- **Instant Messaging:**
    - **Individuals:** Quick communication for health queries.
    - **Organizations:** Healthcare professionals for internal coordination and patient communication.
- **Forums:**
    - **Individuals:** Patients participating in health forums for discussions.
    - **Organizations:** Healthcare organizations for knowledge exchange and community engagement.
- **Email:**
    - **Individuals:** Communication between patients and healthcare providers.
    - **Organizations:** Official communication within healthcare institutions.
- **Blogs:**
    - **Individuals:** Personal health blogs for sharing experiences and tips.
    - **Organizations:** Healthcare organizations may have blogs for health education.
- **Microblogs:**
    - **Individuals:** Quick health tips or updates.
    - **Organizations:** Healthcare institutions for brief health awareness.
- **Social Media:**
    - **Individuals:** Follow health-related pages for information.

- **Organizations:** Healthcare organizations use social media for public health campaigns, awareness, and community engagement.

Information and News Sources:

- **Chat Rooms:**
  - **Individuals:** Engage in real-time discussions on current events.
  - **Organizations:** News agencies may use chat rooms for internal coordination.
- **Instant Messaging:**
  - **Individuals:** Receive news alerts through instant messaging.
  - **Organizations:** News agencies for real-time communication.
- **Forums:**
  - **Individuals:** Participate in forums for discussions on various topics.
  - **Organizations:** News outlets may have forums for reader engagement.
- **Email:**
  - **Individuals:** Subscribe to newsletters for regular updates.
  - **Organizations:** News agencies use email for newsletter distribution.
- **Blogs:**
  - **Individuals:** Read blogs for in-depth analysis and opinions.
  - **Organizations:** News outlets use blogs for opinion pieces and extended coverage.
- **Microblogs:**
  - **Individuals:** Receive quick news updates.
  - **Organizations:** News agencies use microblogs for breaking news and quick updates.
- **Social Media:**
  - **Individuals:** Follow news pages for updates.
  - **Organizations:** News agencies use social media for news dissemination, engagement, and reaching a broader audience.

Government:

- **Chat Rooms:**
  - **Individuals:** Citizens engaging in real-time discussions.
  - **Organizations:** Internal government communication.

- **Instant Messaging:**
    - **Individuals:** Citizens reaching out to government
    -

Impact of Social Networking on Individuals

Intellectual Isolation

Intellectual isolation is when a person doesn't get to hear or learn about different ideas or opinions. It's like being in a bubble where you only see or think about things in one way without much chance to learn from others viewpoints or experiences. Here's some way it could occur:

- Algorithms show content based on user preferences which can create filter bubbles, limiting exposure to diverse perspectives.
- Social networking allows connecting with like minding people creating echo chambers and limiting different viewpoints
- Ability to block/remove/like content on social media only gives selective exposure
- Ability to easily join online communities on forums and chatrooms limits exposure to broad range of idea
- Theres confirmation bias where use actively seek out information that confirms their beliefs, reinforcing their own perspectives
- Social networking allows amplification of certain/negative/stereotypical vies which reduces engagement and contributes to polarization
- There's a reduced face to face interaction that limits deep conversation that may take place in real life which allows you to explore new ideas
- Constant fear of missing out and following latest tends pressurizes to agree with popular ideas on the internet and limit critical/intellectual thinking

Physical and mental health of different age groups

Physical health:

- Excessive use of social media leads to sedentary behavior, reducing physical activity levels
- Late night use of social media cause sleep disturbances
- Excessive use of social networking can cause eyestrain and discomfort

Mental health:

- Can lead to cyber bullying impacting mental health

- Constant comparison of lifestyle with curated feed content on social networks leads to anxiety and lower self esteem
- Social pressure to follow latest trends on the internet can cause stress
- Continuous looking at updates due to FOMO affects mental well being
- Theres a reduce work-life balance as same platforms are use for professional and personal work
- Intense information overload can cause cognitive issues
- Can lead to social isolation as feelings cannot be expressed in a meaningful manner like in real life.
- Worrying of potential online background checks by work can cause discomfort and anxiety in case they find something embarrassing on their online profiles

Ideological Polarization

It is when people strongly disagree and drift apart because of differing beliefs or opinions. It happens when individuals or groups become more divided in their ideas, making it challenging to find common ground or understanding. Ways how it can happen:

- Social media sites/networking allow creation of groups/'echo chambers of/for like-thinking individuals
- Social network can limit/exclude exposure to/expression of alternative viewpoints
- Information is/viewpoints are selective in content
- Users' view can be manipulated by others
- Social networking can create groups of geographically remote but like-minded individuals.

Stereotyping

Stereotyping is having a set of idea of what a person or group of people is like even though that idea may be wrong. Here's some way which may lead to stereotyping of individuals through the use of social networking:

- Social networking can subject individuals to intense scrutiny/surveillance
- Comments can be seen by extremely large numbers of readers
- Comments that are never/would not be made face to face can be made

- Intent in the comment is irrelevant when making social media posts as only the comment, not the content, is seen by reader/jokes may not appear to be joking/sarcasm is lost.
- Individuals may conform to stereotypes demanded by social media to 'fit in' with peers.

Cognitive Issues

Cognitive issues refer to difficulties or challenges related to mental processes such as thinking, memory, problem-solving, attention and perception. These issues can affect a person's ability to understand, learn and process information. Examples include memory loss, difficulty concentrating and problems with decision making. Ways how it can happen due to social networking:

- Excessive screen time can lead to cognitive fatigue, affecting concentration and attention span.
- Constant exposure to high volume of data can overwhelm cognitive processing making it hard to retain or prioritize information effectively.
- Constant multitasking leads divided attention and reduced concentration in task that require focus
- Negative experiences such as cyber bullying and harassment can cause emotional stress and negatively impact cognitive well being
- Constant exposure to curated and idealized content often with no real context leads to increased comparison between your own lifestyle with the 'lifestyle of others' that can be seen online which can affect self esteem
- There's a constant FOMO on social events and 'MUST TRY' experiences that are excessively fueled by social which can create anxiety and cognitive stress
- Privacy concerns are all time high due to potential misuse of personal information may contribute to cognitive stress and anxiety.

Advantages of Social Networking

- Allows communication to occur on a global scale between individuals, businesses and organizations
- Allows people to feel included as they can share thoughts and ideas with those who share similar opinions

- Allows organization to distribute important information to people that could be lifesaving in critical situations
- Allows individuals to make a living writing online blog that others enjoy reading.
- Allows people to seek advice or support on various issues, including technical support and healthcare. This can result in an improved level of customer service and care
- Provides a stream of entertainment for people
- Can expose people to news stories that they otherwise may not be aware of.

Disadvantages of Social Networking

- People can feel overwhelmed by all the information and communication they encounter
- Some people can feel excluded and feel that everyone seems to have a better life than they do.
- Some organizations could falsely represent certain situations and influence opinion of people that are built on censored information
- Social networking influencers can sometimes lead people to think or do things that are harmful, such as over exercise or spend too much on expensive clothing
- Contributions to platforms such as forums can often be made by people who may not be qualified to give advice or support. This could lead to a person acting on incorrect advice and possibly causing harm
- It may be causing people's attention span to decrease as they no longer are able to focus on a single activity for any length of time
- News stories can be sensationalized and falsely reported
- It allows a level of anonymity that can encourage users to participate in bad or sometimes illegal behavior that they would not otherwise do, if they thought people would know who they are.

Impact of Social Networking on businesses, gov, news, org (read and learn from pastpapers)

12.4 <u>The Impact Of IT</u>

Sports-

- **referee assistance:** Technology like VAR(video assistant referee) in football helps in making accurate decisions during games
- **ticketing and access control:** Digital ticketing and efficient access control systems streamline fans' entry to sports venues
- **wearable tech:** Athletes use wearable devices like fitness trackers to monitor their physical condition and performance during training.
- **improved broadcasting:** Offering high quality sports broadcasts and easy online streaming.
- **fan experience in stadiums:** IT improves the in stadium experience with interactive displays and better connectivity
- **virtual training and simulation:** Advanced simulation software helps in strategy planning and skill development
- **data management:** Managing vast amounts of sports data, including player statistics and team records

Manufacturing-

- **robotics:** Increased use of robots for precision, speed and handling hazardous tasks
- **3D printing:** IT advancements have made 3D printing a valuable tool for rapid prototyping and producing complex parts
- **Real-time monitoring:** Real time tracking of manufacturing processes for instant decision making and adjustments
- **automation:** IT enables automation in manufacturing processes, increasing efficiency and reducing human error.
- **AI in design:** AI aids in designing more efficient and innovative products
- **cybersecurity:** Strengthening cybersecurity measures to protect sensitive manufacturing data and intellectual property

Healthcare-

- **remote monitoring device:** Daily wear monitor devices that keep track of patients vitals such as for diabetes and alert user and emergency contacts when its low or high
- **artificial limbs:** Allows disabled and wounded patients to use their wounded hands, arms, legs again or replace them completely and live a fuller life

- **nanotechnology:** Nanotech such as nanobots allow for medicine, eg in cancer, to be precisely delivered avoiding and reducing unnecessary treatment being delivered to healthy cells
- **AI chat support:** Allows to assist patients in navigating healthcare services and answering general queries
- **patient portals:** Online platforms to book and reschedule appointments and keep a track of medical records and prescriptions

Education-

- **interactive whiteboards:** Makes presentations and notes more visually appealing and interactive
- **e-books and digital libraries:** Softcopy of books(e-books) and audio books are easily available in digital libraries making resources more accessible
- **educational video games:** Allows learning to take place from another perspective making it more interesting
- **digital portfolios:** Allows to upload tests and assignments and keep track of them
- **virtual classrooms:** Enables learning to take place anytime and anywhere from the world using video conferencing

Banking-

- **ATMs:** Enables instant cash withdrawals ,deposits and basic transactions with bank tellers
- **digital wallets:** Allows payment information to be stored and enables easy online and in store payments
- **e-statements:** Reduces paper usage and provides instant account updates
- **online banking-** Allows to manage accounts, transfer money and pay bills without visiting a bank
- **improved customer services:** Online 24/7 helplines improves customer services and hels resolves issues without waiting for the weekend to pass by

E-Business and Finance-

Online businesses are now commonplace and is often seen as an easier way of buying goods and services than in a physical store. Goods and services are often cheaper online because of cost savings from businesses not needing a shop space and from reduced utility bills. The main advantage of this is how quickly the customer receives products. Online shopping has become even more popular with the rise of smart devices, because of applications that allow you to order anything online by using your phone. Regardless of where you are. This is even more convenient for the customer as they could be out shopping, not able to find their product in store, but able to order it from the online store straight away from their phone. Online shopping can be better for the environment, because fewer vehicles may be used as people are not driving to shops. But there is a big issue that often its difficult for the people to see the quality of products online or check the size of them. This can mean that many products end up being returned. This may also increase the number of vehicles used.

News and Media-

IT has allowed people to have quick access to news stories around the world and has made people more aware of world events. The use of IT has also allowed people to be amateur journalists themselves, by recording events as they happen and using social media platforms to broadcast this to a wider audience.

This had both positive and negative effect. It has allowed people to see what has happened in certain events, when the media may have chosen to censor the content of those events. Others believe that this could also be harmful and will argue that the media sometimes chose to censor what happens at events, because they believe it could be harmful for people to be fully aware.

People are able to use IT to set up news feeds that are able to draw news stories from all different kinds of media sources. This means that they save time as they do not need to go to site of each individual source and fins the news stories that they want to read. They can set their news interests for the feed and then the software will search for stories that it thinks will interest the user.

Family & Home-

IT is used to control many aspects in the home, such as lighting and heating and people even use these systems from a remote location by using IT. This facility can help people save money and can also be better for the environment. This is because, rather than having the heating on all the day, or heating it on a timer system to start at a certain time, the user can choose to

remotely start the heating system at a precise time that they are about to travel back to their home.

IT can also be present in many everyday devices in the home, such as washing machines and refrigerators, for example, how long a washing machine has left to finish washing clothes.

These devises can also prove to be a source of entertainment to families at home. Families can gather and play lots of games and quizzes using the devices. They can also use the device to stream music. This can help families interact and spend quality time together.

Government & Politics-

The use of IT, especially social media, has become more prominent in government and politics. Social media is often used to raise awareness of different political causes and issues. Many online petitions are set up daily that try and encourage people to sign for the resolution of issues that they support.

The use of IT in politics in this way can help them government to see what issues the people have, and this may help them prioritize what they discuss in the government. It can help the people have a voice and force government to discuss issues that they believe need resolving.

IT has allowed governments to make services they provide accessible online. For example, people may be able to pay their taxes online, and apply for the documents such as a passport or a driving license. This can make access to these services much more convenient for people and could also save costs for the government because they need fewer staff available than if people needed to meet face to face for these services.

Monitoring & Surveillance-

The use of IT in monitoring and surveillance has become very prominent. Many police authorities around the world use it to monitor possible criminal activity and to locate criminals when crimes have been committed.

One example of its use in this way is to combine facial recognition software with CCTV footage. Often a criminal will try and flee an area or a country if they believe they will be caught. This could involve them making a journey using a train or an aeroplane. Train stations and airports often have a lot of CCTV footage available. This footage could be scanned using facial recognition software to see whether the criminal has passed though train station or the train. This type of analysis can save a lot of time as previously, a person would need to have watched hours of footage to see if they could spot the criminal in the footage.

More, people are adding CCTV technology to their home. Special systems can be set up that will monitor the area around a house. If any motion is detected in this area, a user can get an alert to their mobile phones and can instantly view footage of their home to see what or who has created the motion. Some systems allow the user to speak in the speaker this may scare off any person who may be planning to burgle the house.

People have also started to use surveillance methods in their vehicles. Insurance companies use dashboard cameras that will start recording the journey of the driver when the car is switched on. The intention of the footage is to figure out the responsible in case of accident.

It is argued by some that use of IT in these ways, as methods of monitoring and surveillance, is relatively unpoliced at present. Some people highly disagree with the ability of an average person to record them walking down the street or pass their home. They believe that this is an invasion of their privacy and that there needs to be a greater level of laws and regulations governing there use in this way.

12.5 Technology Enhanced Learning

Computer Based Training

- CBT is a learning method that uses computers to deliver educational content.
- Allows self-paced learning without the need of a tutor, making it a flexible and independent learning method.
- The resources are a mixture of multi-media elements such as audio, video, text which makes the learning process more effective
- The training is usually designed to be delivered in small, manageable chunks, facilitating a step-by-step learning process.
- Tests and assignments are included in CBT which are automatically marked, this allows to keep track of progress
- Learners can revisit content multiple times as need be
- CBT ensures a standardized delivery of content, providing a consistent learning experience for all users
- Allows learning to take place virtually from anywhere around the world

Advantages:

- Users can learn at their own pace.
- Different media can be used to create an interesting set of resources
- Staff can improve their skills set and knowledge resulting in promotion or additional pay.

Disadvantages:

- Learners may not have a tutor to answer any questions that they have.
- Staff may not be motivated to follow the computer-based training as they aren't being watched and driven to do so.
- Learners may not be motivated to complete course as it requires you to be have complete focus and good discipline.
- It's not as engaging as in person classroom based learning making it boring and decreasing motivation

Online Tutorials

- Online tutorials are digital guides that teach viewers how to complete or achieve a specific goal/task.
- Online tutorials can be delivered using different media such as text, video tutorial, audio tutorial etc.
- It allows users to learn at their own pace and in their own time
- Users are also able to view the tutorial repeatedly as desired.
- Users can access it from anywhere with an internet connection making it convenient and cost effective.
- A diverse range of tutorials can be found online covering aspects such as baking, cleaning, coding, etc

Advantages:

- Students can have access to teaches/tutors that they otherwise would not be able to contact so they have a greater range of expertise to draw upon in their studies.

- Students can access the tutorial at any time that is convenient so can study as and when they wish
- Students and teachers do not have to be online at the same time so there are less time constraints on the interaction between students and teachers
- Students can access material without having to travel so there are no geographical constraints on where they study from or from where they take courses
- Students can share their studies/ideas/learning with a group without having to be physically be together/have a teacher present
- Tutorials can be recorded for access at any time/can be replayed to review work
- Tutorial material can be studied in any order so students can choose what they study
- Students get instant feedback form periodic pre-set tests/tasks

Disadvantages:

- A reliable inter connection/suitable computing device is/are required to access the tutorial without which there is a digital divide to overcome
- Tutorial may not be at the appropriate level for an individual student so some be disadvantaged
- Lack of a teacher may result in loss of motivation by students in missing important material in the study
- Teacher feedback may not be fast enough to resolve problems in the studies/task

Networked Courses

- It is a form of online collaborative learning that helps learners to connect with other learners as well as their tutors.
- It is designed to help learners develop relationships with each other and their tutors.
- This can help the learning process because there are a number of different people from whom learners can gain feedback in the discussion.
- It mixes live session with self-paced learning activities.
- Classrooms are conducted in virtual environments, enabling real time interactions between tutors and learners.
- The time scales for it are more limited since learners tend to be at same pace in order to exchange helpful feedbacks and comments
- Learners and tutors can join from anywhere in the world making it a global paritcipation

Advantages:

- Learners get to work with other learners and build relationships that they could take forward beyond the course.
- Learners are exposed to both the ability to gain and provide feedback. This means that they build new skills and knowledge and offer the skills and knowledge they have to others also.
- Learners may be more motivated to complete the tasks as the learning of others is also dependent on them.

Disadvantages:

- Some learners may find it difficult to contribute to the process, as they aren't sure what to give back as feedback
- Some learners may be overbearing and dominate all the discussions that take place, not allowing enough contribution to encourage learning from others. Some tutors may find these people difficult to manage.
- Learners may be inclined to just provide positive feedback as they do not feel comfortable criticizing the work of others.
- If some learners do not complete tasks or provide the necessary feedback, this may limit the learning ability of other users, as the timescales for learning are more limited.

Massive Open Online Courses (MOOC)

- MOOCs are large scale, free/affordable online courses that anyone can join on the internet.
- They cover a diverse range of topic and often provide certificates upon completion
- They offer flexible learning for professional skills development or personal interests
- They include filmed lectures and many other resources such as reading material
- Many also provide interactive user forums
- Progress through courses is easily tracked by completing set assignments and tests that are automatically marked or available for peer review.

Advantages

- Can be organized anywhere/time as long as there is connectivity
- Can use global resources
- Can be any language to reflect first language of students
- Can use any online tools that are available to students/known to students/available in the region
- Can use peer review/no exam pressures
- Time zones and physical boundaries can be ignored
- Can be organized quickly/as soon as you inform he students
- Learning is/can be in informal surroundings so student more relaxed
- Can reduce the costs to the college
- There are no other students to distract the learner
- Cross-discipline learning is easier/possible
- Learning can continue beyond the formal time scale of the course
- Encourages active learning beyond course requirements
- Reduces costs to colleges

Disadvantages

- Students who are not digitally literate will not be able to (fully) participate and not make use of the course materials
- User-generated course materials may devalue/undermine the validity of the course
- Students who cannot self-motivate-cannot set own goals will not be able (fully) participate
- Barriers of language/translations may exclude/restrict/disadvantage some participants from (fully) taking part
- Very large amounts of content are difficult to navigate/set up/learn/work through without guidance
- Practical experience/training is limited/resources for practical work are limited
- Some students may not be able/be prepared to devote the time and effort necessary/required for the course

Video-Conferencing

- Video conferencing is when people communicate using computers, displaying a video stream, using an internet connection
- It allow real time conversations to take place
- Sessions can also be recorded for later viewing or reference
- Multiple people can join from anywhere in the world
- It has the facility to allow a user to share the content on their screen with other users that are part of the conference.
- Video quality depends on the conference software and internet connection hence it's not consistent
- Only a limited number of people can join as quality of lesson can be degraded due to connectivity and other technical issues
- Video conference software support both voice and text based communication

Advantages:

- As learners can ask questions in real-time, this may improve their level of learning and understanding.
- As learners can see and hear their educator, this may feel like a personal learning experience and may create an increased level of motivation for the learner as they may find it more engaging.
- The educator can often share what is displayed on their screen with other learners, which could be useful if a demonstration needs to be given.

Disadvantages:

- Video conferencing software can require high broadband speeds that may not be available in some areas.

- Only a small number of learners will be able to be part of the video-conference, and this will be limited by capabilities of the software and the internet connection. This may leave some people waiting a long time for a place on course.

The impact on student achievement and motivation

(from pastpapers for CBT's impact on ^) / 8 marks

Positive Impacts:

- Training is more accessible to learners/students as can be used when and where convenient to student/available at anytime
- Delivery of small amounts of information in a step by step prompts students/leaners to respond to a lesson at intervals/take brief tests regularly
- Provides students/learners with regular/instant/quicker feedback on their responses/overall progress increasing engagement and achievement/retention of knowledge/skills
- Allows students/learners to take courses at their own pace without need for/pressure to keep up with/wait for peers
- Sets learning prerequisites for moving on to/in readiness for the net lesson/section/topic
- Can track progress more accurately/can set individual targets
- Course information is easily/readily available/retrievable for later reference

Negative Impacts:

- Reduced human interaction with teachers/instructors so discussion is more difficult
- Reduced human interaction with fellow students/learners so reduced group work/discussions/assistance
- Teachers/instructors may not always be available when students require assistance
- Students/learners with low motivation will fall behind in their studies
- Without per/class discussions some students will be not confused/not understand fully
- Slow/poor internet connections/older computing devices/power fluctuations may not allow easy access to course materials

^ same and more points can be used for impact on student achievement, learner autonomy & teacher motivation

The impact on teachers' motivation

Positive Impacts:

- Using digital tools makes teaching more creative and fun
- Teachers can keep learning new things online
- Teaching can be more flexible
- Online classes can have more students
- Fast feedback helps teachers improve/
- Teachers can work with others worldwide and share resources and learning methods

Negative Impacts:

- Dealing with technology can be hard
- Online teaching means extra preparation
- Not seeing students in person can be tough
- Keeping students interested online is challenging
- Worrying about students tech problems
- Checking students work online can be difficult.